

REMARKS

This application has been reviewed in light of the Office Action dated March 26, 2004. Claims 1-11 and 15-18 are presented for examination. Claims 12-14 have been canceled, without prejudice or disclaimer of subject matter. Claims 1-11 and 15-18 have been amended to define more clearly what Applicant regards as his invention. Claims 1, 7, 10, 11, 15, and 17 are in independent form. Favorable reconsideration is requested. The claims canceled herein will not be discussed further.

The Office Action states that the title of the invention is not descriptive. The title has been amended to read as follows:

--IMAGE PROCESSING APPARATUS PROVIDING NOISE
CORRECTION--.

Applicant respectfully submits that the title, as amended, is clearly indicative of the invention to which the claims are directed.

The specification was objected to because of the informalities noted at pages 2 and 3 of the Office Action. Specifically, the Examiner asserts that there is no detailed description of Figures 4 and 5. Applicant has amended the specification at page 11, line 5, to include a reference to Figures 4 and 5. Reference to "line sensors 31" at page 10, line 17, of the specification has amended this reference to read --line sensors 71--. As discussed previously, Applicant has amended Figure 7B by changing the occurrences of "31" to read --71--. As to the objection concerning page 19, lines 10-12, of the specification, Applicant has amended Figure 8 to correspond to the description at page 19, lines 10-12, specifically by amending this figure, among other things, such that "ROM 32c" reads --ROM 32b--, "RAM 32d" reads --RAM 32c--, "EEPROM 32e" to read --EEPROM 32d--, "A/D 32f" to read --A/D 32e--, and "TM 32 g" to read --TM 32f--. As to the state of switch SW1 in Figure 14,

Applicant has amended the phrase, "switch SW1 is off at Step (001)" at page 22, line 9, of the specification to read --switch SW1 is on at Step (001)--. Applicant also amends "Step (900)" at page 27, line 11 to read --Step (807) in Figure 10--. Applicant amends the phrase "at Step next" at page 27, line 10, to read --at Step (901) next--. Applicant also adopts the Examiner's suggestion with regard to the term "sleeve" appearing on page 29, line 12 of the specification.

It is believed that the objections to the specification have been remedied, and their withdrawal is therefore respectfully requested.

The Office Action also objected to the drawings on the grounds stated at pages 3 and 4 of the Office Action. Applicant has carefully reviewed and amended Figures 1, 2, 3, 6A, 7A, 7B, 7C, 8, and 10, as discussed previously, to overcome the noted objections. As to the objection of Figure 14, Applicant has amended the specification at page 22, line 24, to amend the term "switch SW2" to read --switch SW2 (005)--, and at page 23, line 3, Applicant has amended the term "mechanism" to read --mechanism (006)--.

As to the term "distance measurement point 1" at page 21, line 6 of the specification, Applicant has amended Figure 6A to identify this element. Applicant also has the following comments regarding this element. The distance measurement point 1 recited at page 21, line 6, is one of a number of distance measurement areas described at page 11, line 12, of the specification, and thus is clearly shown in Figure 6A.¹ Support for this element may also be found at least at page 11, line 9, to page 12, line 2, and from page 20, line 18, to page 21, line 23.

¹/ It is understood, of course, that the claim scope is not limited by the details of the described embodiments, which are referred to only to facilitate explanation

It is believed that the objections to the drawings have been remedied, and their withdrawal is therefore respectfully requested.

Claims 7-10 were objected to on the ground noted at pages 4 and 5 of the Office Action. Applicant has amended these claims to overcome the noted objection, and respectfully requests its withdrawal.

Claims 1-9 and 15-18 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,943,094 (*Sakai et al.*), and Claims 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sakai et al.* in view of U.S. Patent No. 6,154,253 (*Kiri et al.*).

As shown above, Applicant has amended independent Claims 1, 7, 10, 11, 15, and 17 in terms that more clearly define the present invention. Applicant submits that these amended independent claims, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art for at least the following reasons.

The aspect of the present invention set forth in Claim 1 is an image processing apparatus. The apparatus includes a photoelectric conversion unit including a plurality of pixels, and a noise correction device correcting noise in each of a plurality of signals from the plurality of pixels by using the plurality of signals accumulated in each pixel of the plurality of pixels during a plurality of different time periods, respectively.

Among other important features recited in Claim 1 is that the apparatus corrects noise in each of a plurality of signals from the plurality of pixels by using the plurality of signals accumulated in each pixel of the plurality of pixels during a plurality of different time periods, respectively. That is, the image processing apparatus corrects noise in each of the signals from pixels using signals accumulated in each pixel during different time periods, respectively.

Sakai et al. relates to an image pickup device of an electronic still camera or the like using a solid state image pickup element and a noise suppression technique. *Sakai et al.* discusses correcting noise in a signal output from a pixel in accordance with noise information obtained from the pixel during two or more arbitrary different accumulation times. Apparently, *Sakai et al.* teaches that noise data captured in a solid-state image pickup element is captured during both closed shutter and open shutter states as a whole frame in a non-exposure state. Noise information is then produced by averaging these signals read out from the image pickup element a plurality of times and applied to the signal to correct noise.

Kiri et al., which relates to an object detection mechanism in imaging devices, is cited in the Office Action as discussing distance measurement means.

Applicant has found nothing in *Sakai et al.* that would teach or suggest correcting noise in each of a plurality of signals from the plurality of pixels by using the plurality of signals accumulated in each pixel of the plurality of pixels during a plurality of different time periods, respectively, as recited in Claim 1.

For at least the above reason, Applicant submits that Claim 1 is clearly patentable over *Sakai et al.*

Independent Claims 15 and 17 are method and storage medium claims, respectively corresponding to apparatus Claim 1, and are believed to be patentable over *Sakai et al.* for at least the same reasons as discussed above in connection with Claim 1.

Applicant has also found nothing in *Kiri et al.* that would teach or suggest correcting noise in each of a plurality of signals from the plurality of pixels by using the plurality of signals accumulated in each pixel of the plurality of pixels during a plurality of different time periods, respectively, as recited in Claim 10.

Accordingly, Applicant submits that Claim 10 is clearly patentable over *Sakai et al.* and *Kiri et al.*, whether considered separately or in any proper and permissible combination.

The aspect of the present invention set forth in Claim 7 is an image processing apparatus. The apparatus includes a photoelectric conversion unit including a plurality of pixels, and a storage device which stores noise information of each pixel of the plurality of pixels for noise independent from an accumulation time period and noise information of each pixel for noise dependent upon the accumulation time period. The apparatus also includes a noise correction device for correcting noise in a signal output from the photoelectric conversion unit by using the noise information for the noise independent from the accumulation time period and the noise information for the noise dependent upon the accumulation time period, stored in the storage device.

Among other important features recited in Claim 7 are storing noise information of each pixel of the plurality of pixels for noise independent from an accumulation time period and noise information of each pixel for noise dependent upon the accumulation time period, and correcting noises in a signal output from the photoelectric conversion unit by using the noise information for the noise independent from the accumulation time period and the noise information for the noise dependent upon the accumulation time period, stored in the storage device.

Applicant has found nothing in *Sakai et al.* that would teach or suggest storing noise information of each pixel of the plurality of pixels for noise independent from an accumulation time period and noise information of each pixel for noise dependent upon the accumulation time period, and correcting noise in a signal output from the photoelectric conversion unit by using the noise information for the noise independent from the

accumulation time period and the noise information for the noise dependent upon the accumulation time period, stored in the storage device, as recited in Claim 7.

Accordingly, Applicant submits that Claim 7 is clearly patentable over *Sakai et al.*

Applicant has also found nothing in *Kiri et al.* that would teach or suggest storing noise information of a pixel of the plurality of pixels for noise independent from an accumulation time period and noise information of a pixel for noise dependent upon the accumulation time period, and correcting noise in a signal output from the photoelectric conversion unit by using the noise information for the noise independent from the accumulation time period and the noise information for the noise dependent upon the accumulation time period, stored in the storage device, as recited in Claim 11.

Accordingly, Applicant submits that Claim 11 is clearly patentable over *Sakai et al.* and *Kiri et al.*, whether considered separately or in any proper and permissible combination.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,


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AMENDMENTS TO THE DRAWINGS

Attached herewith are six (6) corrected replacement drawing sheets to be substituted for the corresponding drawing sheets presently on file in the above-identified application. The attached replacement drawing sheets include the changes to Figures 1, 2, 3, 6A, 7A, 7B, 7C, 8, and 10. The replacement drawing sheets incorporate the changes required in reply to the Office Action dated March 26, 2004, and are not believed to add new matter to the original disclosure. More specifically, the changes are as follows:

Figures 1, 2, 3, and 7A-C have been labeled "Prior Art".

In Figure 6A, Applicant has amended this figure to identify a "Distance Measurement Point 1".

Figure 7B has also been amended to change reference designator "31" to read --71--, so as to be consistent with the specification.

Figure 8 has been amended to delete the following reference designators (and symbols) DMTR, ENCZ, ENCF, SENCZ, ZMF, ZMR, LMTR, DMS, LMF, LMR, SENC, LPRS, VL, DCL, DLC, LCK, CGND, LCM, MG2, MG1, SMG1, TR1, SMG2, TR2, MTR1, M1F, M1R, MDR1, MPS1, MPS2, MDR2, M2F, M2R, MTR2, OLC, ILC, DSP, SSPC, SPC, SEL0, SEL1, DSH, BTIME, CK1, and CK2. Figure 8 has also been amended to change reference designators "32c, 32d, 32e, 32f, and 32g", to read --32b, 32c, 32d, 32e, and 32f--, respectively.

Figure 10 has been amended to change reference designator "900" to read --807--.

Attachments: Replacement Sheets

Annotated Sheets Showing Changes



FIG. 1 PRIOR ART

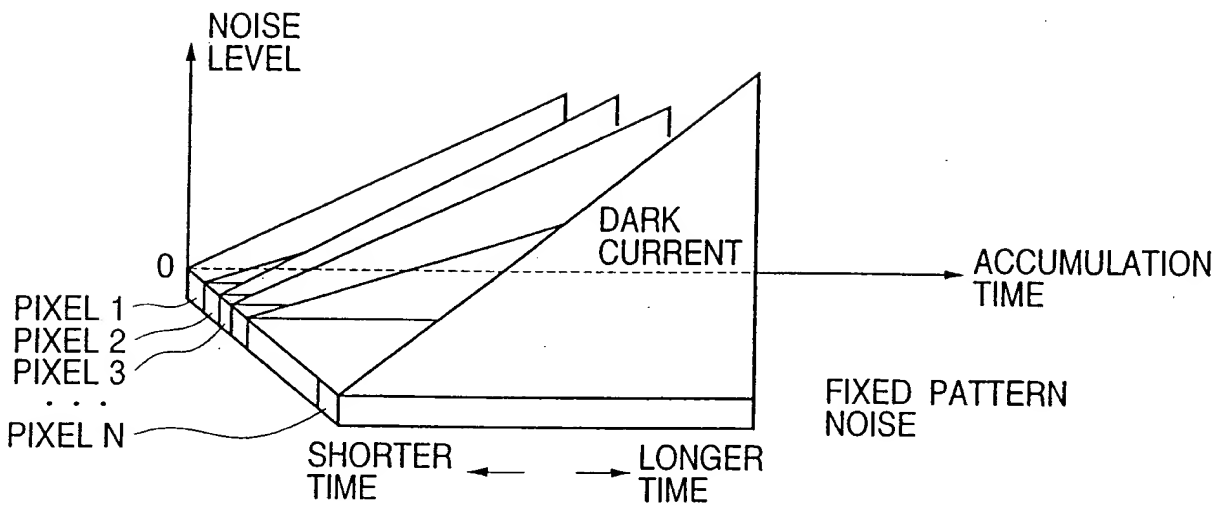
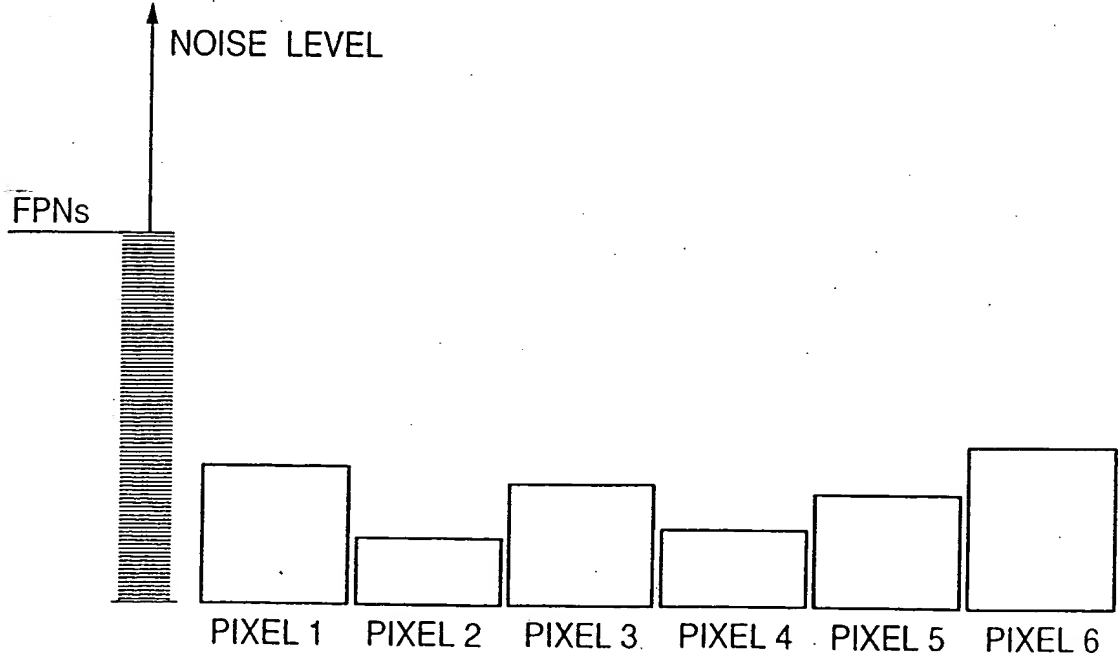


FIG. 2 PRIOR ART

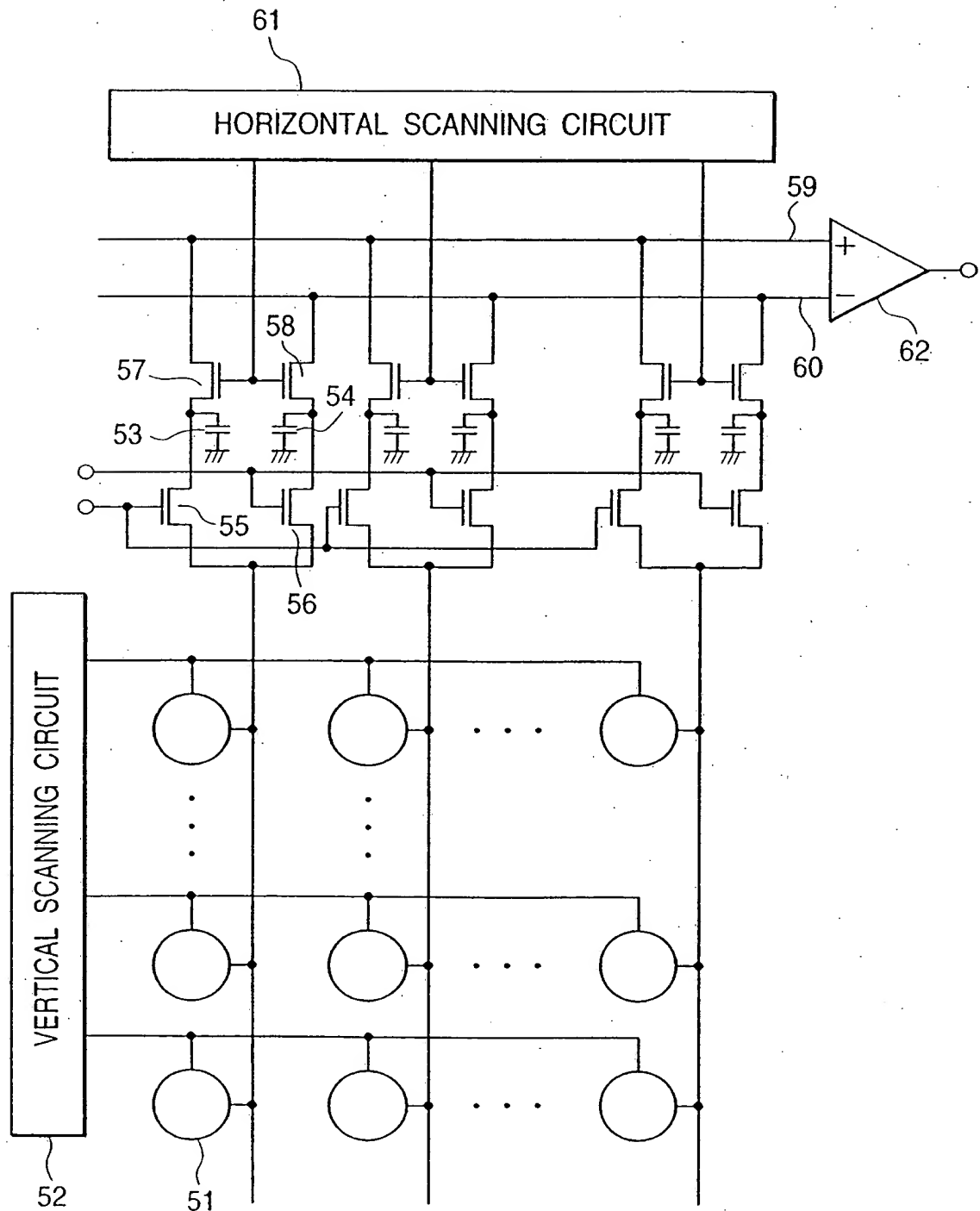




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Appln. No. 09/400,549
Admend. Dated 08/26/04
Reply to Office Action of 03/26/04
Annotated Sheet

FIG. 3 PRIOR ART





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Annotated Sheet

FIG. 6A

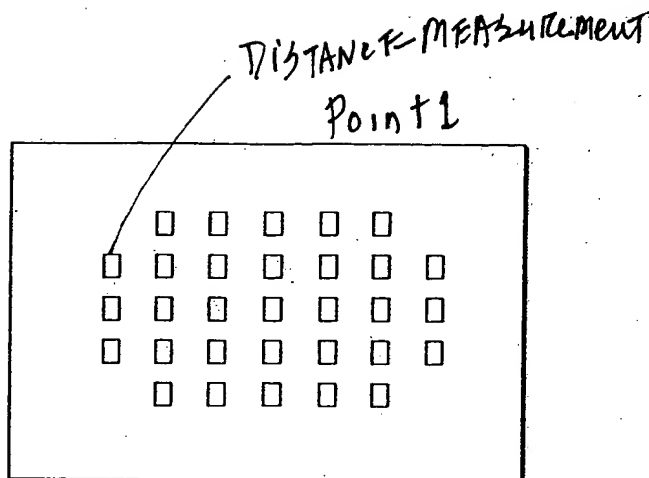


FIG. 6B

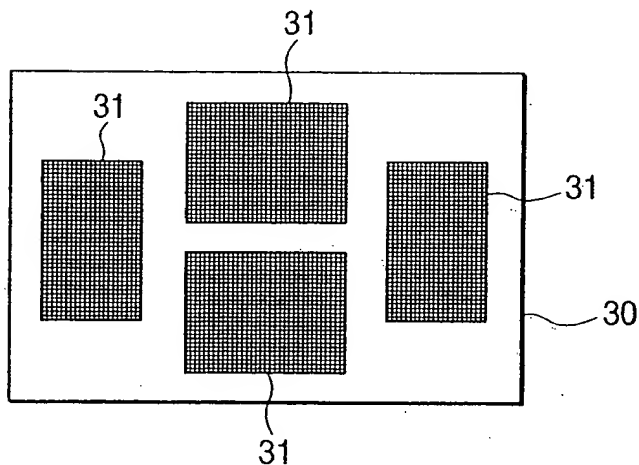
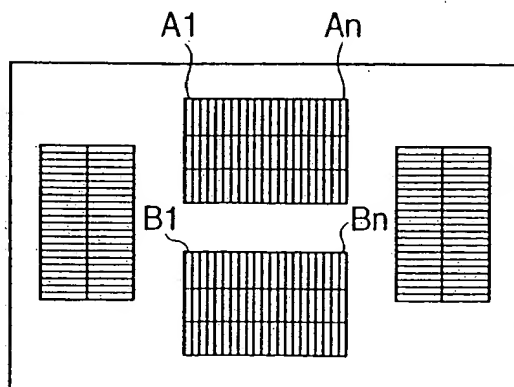
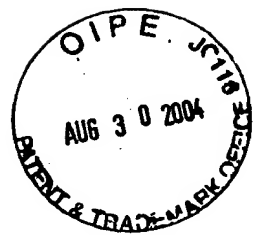


FIG. 6C





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FIG. 7A

PRIOR ART

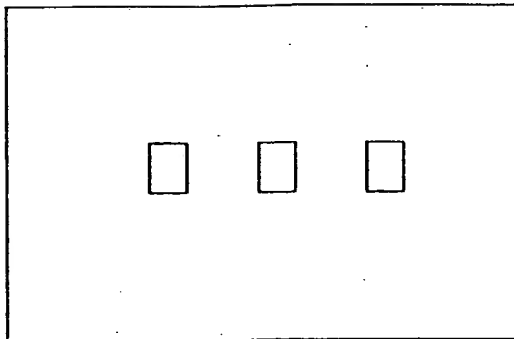


FIG. 7B

PRIOR ART

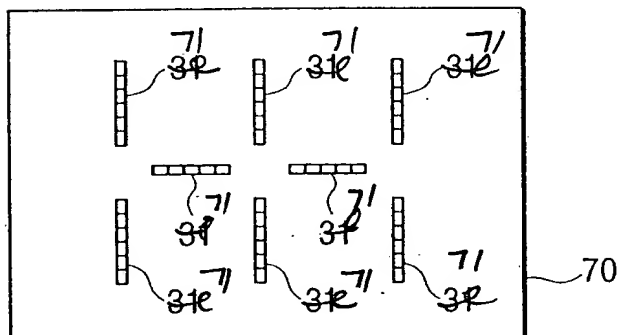
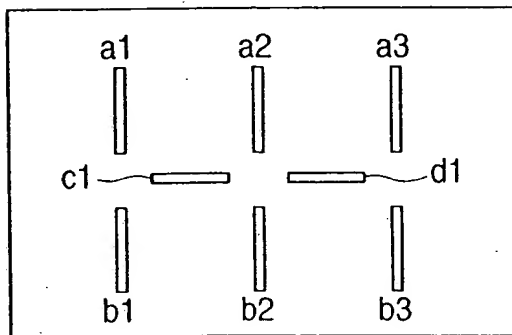


FIG. 7C

PRIOR ART







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FIG. 10

